

**COVERSHEET  
STANDARD OPERATING PROCEDURE**

**Operation Title:** **EQUIPMENT DECONTAMINATION PROTOCOL**

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Standard Operating Procedure: **RWM-DR-017**

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## **1.0 PURPOSE**

The purpose of this document is to describe the Maine Department of Environmental Protection, Bureau of Remediation and Waste Management (BRWM), Division Remediation (MEDEP/DR) procedure for decontamination of equipment used at uncontrolled hazardous substance sites.

## **2.0 APPLICABILITY**

MEDEP/DR is responsible for the investigation and remediation of uncontrolled hazardous substance sites throughout Maine. In the course of the investigation and subsequent remediation, both simple and sophisticated equipment are used to collect samples and gather data pertinent to identifying the characteristics of the site. This standard operating procedure (SOP) is a guideline for the decontamination of all equipment at uncontrolled hazardous substance sites.

This SOP is not intended for decontamination of personnel. Personnel decontamination requirements are outlined in the BRWM "Decontamination Program" SOP, which can be found as an attachment to the BRWM/DR QAP. If personnel decontamination is required for a project (beyond the removal of disposal personal protective equipment), these procedures must be outlined in the project specific Health and Safety plan (HASP), developed following the BRWM's Decontamination Program SOP.

## **3.0 RESPONSIBILITIES**

All MEDEP/DR staff must follow this procedure when performing field activities requiring the decontamination of field equipment. All Managers and Supervisors are responsible for ensuring that their staff are familiar with and adhere to this procedure.

## **4.0 INTRODUCTION**

Decontamination is an essential part of a successful field operation. This procedure is intended to ensure that field equipment is properly and adequately decontaminated in order to preserve the integrity of data collected with that equipment in the field as well as to protect staff working with the equipment from exposure to contaminants.

In addition to this guideline, personnel using a specific piece of equipment for the first time should also review the manufacturer's user manual for any equipment specific decontamination procedures recommended by that manufacturer. All user manuals for equipment available to MEDEP/DR personnel are kept with the MEDEP/DR Oil and Hazardous Materials Specialists (OHMS), or with the MEDEP Division of Technical Services (MEDEP/TS) Geologist Technician.

## **5.0 PLANNING**

Prior to conducting any type of sampling or other field work, a sampling and analysis plan (SAP) or in the case of remedial activities, a work plan, and a health and safety plan (HASP) must be developed. Protocol for the development of a Sampling and Analysis Plan can be found in DSR's SOP #014 – Development of a Sampling and Analysis Plan. A conceptual site model

which includes expected contaminants to be encountered is part of a SAP. Specific chemicals, particularly when sampling containers or tanks, may require the use of neutralizing agents or other specialty decontamination procedures. The need for special decontamination agents for chemicals expected to be found at a site must be outlined in the SAP.

Decontamination procedures should be completed with an appropriate level of personnel protection. PPE required for staff conducting decontamination must also be indicated in the SAP/ HASP. .

## **6.0 EQUIPMENT**

Equipment required for decontamination may include:

- Brushes, scrapers, sponges;
- Spray bottles;
- Water, tap or deionized;
- Soap, such as liquinox;
- Paper towels;
- Methanol or other solvent wash (as needed).

Other specialty decontamination equipment, such as a powered high pressure wash or special neutralizing chemicals, may be required, and must be described in the SAP.

## **7.0 GUIDELINES/PROCEDURES**

Decontamination generally involves three steps: 1) gross contamination removal; 2) field decontamination; 3) secondary decontamination.

### **7.1 GROSS CONTAMINATION REMOVAL**

Gross contamination removal involves the removal of large dirt and mud chunks or clods, and other visible contamination, from the object being decontaminated, and prevents washwater from becoming contaminated by mud and dirt.

If a piece of equipment is grossly contaminated, use appropriate tools/equipment (for example, scraper, bristle brush, sponge, etc.) to remove the excess soil, sludge, and other obvious contamination. While removing the contamination, spray the items of equipment with water or a detergent/water solution. Such spraying (especially from a high pressure sprayer) may loosen the contamination with a minimal amount of effort. Remember that each item used for the decontamination of equipment may also become contaminated and must be appropriately handled, stored, and either decontaminated itself or disposed of. Also be aware that all of the above

In addition, the decontamination of equipment generates contaminated rinse liquids, sludges, etc., that potentially may need to be containerized onsite until proper disposal arrangements are made. In some instances, the levels of contamination may be sufficiently low and disposal at a hazardous waste facility may not be necessary. This decision will be made by field personnel on a site by site basis following consultation with the project manager.

Certain items that become grossly contaminated and cannot be practically decontaminated (i.e. small tools and tools with wooden handles) should be disposed of properly. In some instances it is more practical and sensible to dispose of these items properly than to attempt

decontamination. Such decisions will be made by the field personnel performing the work activities at the site.

## **7.2 FIELD DECONTAMINATION**

Once the gross contamination has been removed from a piece of equipment, a more thorough cleaning involving detergents (Liquinox® is the standard detergent of MEDEP/DR) and rinses should be done. The primary steps to take when performing field decontamination of equipment are dependent on what item of equipment is being decontaminated; however, these steps will generally be followed:

- 1) Disassemble the equipment (if applicable), and place in a bucket or suitable sized basin filled with a deionized or tap water and Liquinox® (or other appropriate detergent);
- 2) Scrub the equipment thoroughly with a suitable sized brush;
- 3) Rinse the inside and outside of the equipment with deionized or tap water;
- 3A) Rinse equipment with methanol solvent wash (if determined necessary, see below);
- 4) Inspect equipment to assure proper decontamination.

In some instances, an additional wash with methanol may be required. The need for a methanol solvent (or other solvent, or chemical neutralizing agent) wash will be determined on a project by project bases, and if required, outlined in the projects SAP. A methanol solvent wash may be necessary in the case of sampling in high levels of contamination, or when sampling particularly difficult to clean contamination such as coal tar.

Instruments such as pH meters, conductivity meters, and other instruments which are immersed in a medium also need field decontamination. In many cases, these instruments do not come into contact with the actual "material" that will be collected for analysis. An example would be collection of groundwater samples using "low flow" methodology (Low flow methodology is outlined in SOP DR#003). In instances such as this, a thorough rinsing of the instrument probes would suffice, with additional decontamination to follow after the sampling event in a controlled indoor environment, when greater care can be taken so the instrument is not damaged.

If the equipment to be decontaminated is delicate, such as a PID or a CGI, care must be taken when decontaminating so the equipment is not damaged. The best way to avoid the need to decontaminate items such as these is to prevent contact with contamination in the first place. Develop a method of wrapping/bagging these instruments in polyethylene sheeting/bags so that contact with contamination is minimized but the performance of the instrument is not adversely affected.

## **8.3 SECONDARY DECONTAMINATION**

It is recommended that all field equipment be decontaminated again upon the end of a project in a controlled environment (i.e., indoors, with uninterrupted water delivery) to assure that it has been properly decontaminated and is still working before its next use. Procedures for secondary decontamination would mimic field decontamination, however the availability of uninterrupted water under pressure, plus counter space and being indoors, would allow for greater care taken during decontamination.

## **8.4 LARGE EQUIPMENT DECONTAMINATION**

For site work involving large equipment, such as backhoes, bulldozers, drill rigs, etc., a site specific decontamination procedure will be required in the Site specific work plan. As a guideline, a thorough brushing, scraping, washing and/or steam cleaning should be completed. Such maximum contact points as tires, treads, buckets, blades, and drill pipe/bits, should be thoroughly decontaminated in an effort to prevent migration of contaminants off the site. At sites where equipment becomes highly contaminated, provisions to collect rinsate water/solutions may have to be made.

## **9.0 DECONTAMINATION ALTERNATIVES**

Decontamination is, by its nature, an arduous and painstaking task which is often better to avoid. This Division will exercise the option to avoid decontamination procedures whenever feasible by implementing alternative plans of action. By eliminating contact with contamination and/or using disposable equipment, decontamination of equipment may be avoided. Such alternatives are:

- 1) Dedicating specific equipment to a specific site (i.e. specific bailers to specific wells) when economically feasible;
- 2) Using disposable equipment when applicable (drum thieves), and;
- 3) Wrapping monitoring equipment in plastic bags(or other materials) to protect from contamination.

It is important to keep monitoring equipment such as photoionization detectors (PID) or combustible gas indicator(CGI) from contacting soil or liquids at hazardous substance sites. However, if an instrument becomes contaminated it must be decontaminated, regardless as to how protected the equipment was. Additionally, all equipment should be inspected and decontaminated at the end of the project even if protected from contamination.

## **8.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)**

Data quality objectives (DQOs) must be determined prior to sampling, and outlined in the SAP. **Equipment blanks** are samples obtained from equipment rinsate and may be collected to assure decontamination is effective, and preventing cross contamination. Equipment blanks should be collected at a rate of 5%, or as stated in the SAP to meet DQOs.

### **8.1 EQUIPMENT BLANK COLLECTION PROCEDURE**

- 1) Procure appropriate water (See Section 8.1.1) for equipment blank and store in clean area;
- 2) decontaminate equipment, following procedure outlined in Section 7;
- 3) Rinse equipment again with blank water, and collect into sample containers for laboratory analysis. Try to drain rinse water directly into containers; however, it may be necessary to utilize a rinsate collection trough, or a funnel. Be sure to decontaminate trough or funnel prior to using for collection of blank.
- 4) Store/preserve samples with other samples, and submit to laboratory following standard chain of custody protocol.

### **8.1.1 Equipment Blank Water**

Equipment blank water should consist of de - ionized water procured from the laboratory conducting the analysis. However, tap water may be used if metals and trihalomethanes are not contaminants of concern. Source of equipment blank water will be stated in the SAP, and documented in the field notes of the sampling event.

## **9.0 DOCUMENTATION**

Documentation of decontamination activities, including collection of equipment blanks, should be conducted as outlined in BRWM/DR SOP DR#013, Documentation of Field Notes and development of a Trip Report, and the SAP.